

National Aeronautics and Space Administration



goddardview

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Student Project to Protect Astronauts Wins Award

By Keith Henry

A NASA-sponsored student team has won the Penn State University College of Engineering Senior Design Project award for their contributions to the study of astronaut safety. The project is the culmination of undergraduate study for a bachelor's degree in industrial, electrical, mechanical, nuclear, and other engineering disciplines. Projects were sponsored by more than 50 different companies and organizations.

The award is judged on technical content, customer satisfaction, project management, oral presentation, and display. Nearly 100 undergraduate engineering students competed for the top prize.

A five-member team from Pennsylvania State University designed and built a functioning scale model of a collapsible strut, one concept being studied by NASA to absorb excess energy upon Earth reentry for either a water or land landing. A series of these struts special-purpose shock absorbers would attach to the crew seat pallet that supports up to six astronaut seats.

The students were tasked to build a self-adjusting strut that uses simple friction for braking, while making use of the latest technology to precisely control the stroke for maximum protection for the crew.

With the student design, as a capsule impacts the surface, multiple struts would sense pressure and send rapid-fire electrical signals to an onboard controller. The controller would adjust each strut to provide the optimum resistance, increasing strut friction as needed throughout the stroke. The system is designed to work for multiple landing cases.

The strut worked as intended. It will also give NASA an opportunity to check out new closed loop control software.

The NASA Engineering and Safety Center (NESC) is assessing such an active strut system as an alternative design for the Orion crew module which, in turn, is being considered as a return capsule from the International Space Station. The student project was funded by the NESC as part of its Orion Seat Attenuation assessment.

"The students did a really great job on the project, including using their engineering skill and ingenuity to recover quickly from some early setbacks," said Joe Pellicciotti, NASA Technical Fellow for NESC Mechanical Systems and mentor of the student project. Pellicciotti performs his NESC duties from Goddard. "This is the kind of thing we want to do more of," he added.

Team members were: Dan Barry, Elizabethtown, Pa.; Nathan Chidiac, Harrisburg, Pa.; Josh Dobson, Lebanon, Pa.; Nick Evans, Harrisburg, Pa.; and Matt Ellis, Lititz, Pa.

NESC's mission is to perform value-added independent testing, analysis and assessments of NASA's high-risk projects to ensure safety and mission success.

For more information about the NASA Engineering and Safety Center, visit: <http://www.nasa.gov/offices/nesc/home/index.html>. ■

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Cover caption: Two rows of the Discover supercomputer at the NASA Center for Climate Simulation contain more than 4,000 computer processors. Discover has a total of nearly 15,000 processors.

Photo credit: NASA/Goddard/Pat Izzo

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NASA Celebrates Success of First TDRS with Special Event

By Susan Hendrix

A large gathering of NASA employees and other distinguished guests gathered to celebrate at the Goddard's Visitor Center. They were there to pay tribute to an engineering team who pioneered space-based communications and toasted the Agency's highly successful *Tracking and Data Relay Satellite 1* (TDRS 1), mission.

Distinguished NASA guests for this special event included Goddard Center Director Rob Strain, former Goddard Director Joe Rothenberg, Deputy Associate Administrator for Space Operations Lynn Cline, Deputy Associate Administrator for Space Communications and Navigation Badri Younes, Goddard's Deputy Director for Science and Technology Orlando Figueroa, and several other representatives from private industry.

Guests enjoyed reminiscing with former colleagues about the trials and tribulations of the TDRS-1 mission, which was initially feared a failure shortly after launch and deploy.

Younes welcomed guests to the event saying, "TDRS-1's 26 years of outstanding service is a credit to a superb team of amazing people with unmatched competency embodying NASA's can do attitude. The team constantly pushes the envelope of reliability to enable a wide set of missions and customers... that meet and exceed mission requirements."

Phil Liebrecht, NASA's Deputy Program Manager for Space Communications and Navigation, served as master of ceremonies. As a 30-year veteran of the TDRS program, Liebrecht spoke wholeheartedly of the astounding history of the TDRS System and of TDRS-1 in particular. He shared a special video with attendees that highlighted the TDRS program, its people and their accomplishments.

The evening also included a special plaque presentation by Cline to the Goddard TDRS team that Figueroa accepted on their behalf. Cline also presented a plaque to NASA's Space Communications and Navigation Program in gratitude for their many years of support that Younes accepted.



Photo credit: NASA/Goddard/Pat Izzo

Caption: Badri Younes, Deputy Associate Administrator for Space Communications and Navigation (left), accepts the plaque presented by Lynn Cline, Deputy Associate Administrator for Space Operations, to the Space Communications and Navigation Program. The plaque commemorates more than 25 years of high-quality communications support.

NASA launched TDRS-1 aboard the Shuttle *Challenger* on April 4, 1983. This first satellite in NASA's Space Network had a very tumultuous start. Problems with the booster rocket left the satellite in an elliptical orbit and unable to perform its intended function.

Fearing a total loss, NASA engineers rolled up their sleeves, determined to maneuver TDRS-1 into the required geosynchronous orbit. Using the spacecraft's tiny, one-pound thrusters, the team performed a staggering 39 burns lasting up to two hours each over a period of months to nudge the satellite into its proper orbit where it dutifully performed for more than two decades.

Before NASA officially decommissioned TDRS-1 in late 2009, this unique satellite was used in ways never expected, including a number of unorthodox engineering tests and demonstrations that pushed the envelope in satellite communications.

Due to its increasing orbit inclination, it was the first TDRS satellite able to actually view the North and South Poles. An uplink/downlink station for TDRS-1 was installed in January 1999 at the exact South Pole in cooperation with the National Science Foundation, providing research scientists at the Amundsen-Scott Base the year-round ability to return high volumes of science data to the Continental United States for about five hours each day.

NASA first considered retiring the aging TDRS-1 in 1998, but instead agreed to allow the National Science Foundation and others to use the satellite for unique scientific, humanitarian, and educational purposes. It was during this period that the satellite achieved some amazing firsts.

TDRS-1 was used in 1999 for a medical emergency at McMurdo Station. Its high-speed connectivity allowed scientists to conduct a telemedicine conference, providing doctors in the United States with the ability to guide a welder through a real surgery on a visiting physician who was diagnosed with breast cancer. Another telemedicine first occurred in 2002 for remote assist to repair a researcher's damaged knee.

Younes told attendees, "It was an honor and a great pleasure to celebrate such a dedicated service with many members of this team, including some of the early pioneers. To them all, we owe a debt of gratitude. Their legacy will continue to live on."

Today, NASA's Space Network operates the Tracking Data and Relay Satellite System of nine satellites and various ground stations to relay science data and communications from dozens of customers. Two new satellites are scheduled to join the TDRS fleet in 2012 and 2013 respectively. ■

NASA Center for Climate Simulation: Data Supporting Science

By Jarrett Cohen

Debuting in spring 2010, the NASA Center for Climate Simulation (NCCS) is the new name for a Goddard organization that has provided supercomputing resources to NASA scientists and engineers for over 25 years.

"Computation here at Goddard is primarily to create datasets and make them available for science researchers around the world," said Phil Webster, Chief of Goddard's Computational and Information Sciences and Technology Office, which includes NCCS. With climate and weather modeling representing the bulk of NCCS computing, the new name reflects "our mission to support NASA Earth science."

This science is carried out by hundreds of NCCS users from Goddard, other NASA Centers, laboratories, and universities across the U.S. The two largest user groups are Goddard's Global Modeling and Assimilation Office (GMAO), headed by Michele Rienecker, and the Goddard Institute for Space Studies (GISS), directed by Jim Hansen. NCCS-hosted simulations span time scales from days (weather prediction) to seasons and years (short-term climate prediction) to decades and centuries (climate change projection).

Data-Centric Science

At any time scale, NASA climate simulations use and produce vast amounts of data. "The unique thing about NASA is that we are the source of most of the research satellite observational data of the atmosphere, land, and ocean," Webster said. Add data from the National Oceanic and Atmospheric Administration (NOAA) and other sources, and GMAO needs to process as many as 8 million observations from satellites and additional platforms per day before assimilating them into models.

Data assimilation and other techniques create the right starting conditions for simulating physical processes around the Earth. In predicting future conditions, climate models generate data much like the observations: temperature, humidity, wind speed and direction, precipitation, and other values. Data processing requirements can be considerable. The largest project run at NCCS to date—GMAO's Modern Era Retrospective-analysis for Research and Applications (MERRA)—ingests more than 50 billion observations over the Earth Observing System satellite era. MERRA will eventually produce more than 150 terabytes (tera = trillion) of value-added Earth science data. Today's climate science is "data-centric," as Webster describes it. "Everything we do supports the creation, utilization, and exploitation of Earth science model data," he said. The new NCCS is expanding its services to meet NASA's growing climate data needs.

Augmented Supercomputer

The heart of the new NCCS is the Discover supercomputer. In 2009, NCCS added more than 8,000 computer processors to Discover, for a total of nearly 15,000 processors. The new processors are from Intel's latest Xeon 5500 series, which uses the Nehalem architecture introduced in spring 2009.

Nehalem is well suited to climate studies, offering greater speed, larger memory, and faster memory access than processors installed just one year before. Significant augmentations to Discover will occur in summer 2010.



Caption: The Discover supercomputer glows with power.

Photo credit: NASA/Goddard/Pat Izzo

"With the new augmentations of Discover we probably have a 3 to 4x increase in the amount of work that we can push through the computer in a day," Webster said. "You can run more simulations at the same resolutions you've had, but the thing that really excites us is that we can run much higher resolution simulations."

Using Discover's new Nehalem processors, a "cubed-sphere" version of GMAO's flagship Goddard Earth Observing System Model, Version 5 (GEOS-5) ran at resolutions including 3.5 kilometers—equaling the highest resolution to date for a global climate model. Most startling is the formation of numerous cloud types at groundbreaking fidelity. "When you hold that up against pictures taken from satellites, it's almost impossible to tell the difference between the simulation and the pictures," Webster said.

Working with Data

In addition to powerful computers, NCCS has long had a massive data archive for researchers to store, and later retrieve, model output and other data. The archive's current capacity is 17.5 petabytes (peta = 1,000 trillion). A new data management system (DMS) will reduce dataset duplication and keep the most heavily used datasets online for faster access. DMS software tools will help users to more easily locate and access the data they need.

NCCS is also expanding its data analysis and visualization capabilities. Webster explained that it is very difficult to analyze terabytes of data on a standard workstation, which might have a few hundred gigabytes of disk and perhaps eight gigabytes of memory. The NCCS' "Dali" analysis system offers "a machine comparable to the size of the data that is being generated by the computing center," Webster said. It is "specifically designed to allow a scientist to use that data as quickly as possible." Dali's capabilities include data visualization, scientific workflow management, and diagnostics for model evaluation and comparison. For visualization at room size, a 17-by-6-foot multi-screen visualization wall is engaging visitors and scientists with high definition movies of simulation results.

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NCCS: Data Supporting Science

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Photo credit: NASA/Goddard/Pat Izzo

Caption: The NASA Center for Climate Simulation (NCCS) Data Exploration Theater features a 17- by 6-foot multi-screen visualization wall for engaging visitors and scientists with high-definition movies of simulation results. Here, the wall displays a 3.5-kilometer-resolution global simulation that captures numerous cloud types at groundbreaking fidelity.

Over the last few years, NCCS has distributed simulation data to users and non-users alike through its Data Portal. Especially to support data distribution for NASA's Intergovernmental Panel on Climate Change (IPCC) simulations, NCCS is deploying a node on the Earth System Grid (ESG). ESG integrates supercomputers with large-scale data and analysis servers at national laboratories and research centers, with the goal of "turning climate datasets into community resources."

The IPCC's Fifth Assessment Report, due to be completed in 2014, will include input from climate modeling groups worldwide. NASA contributions will come from GISS and GMAO, which are running the latest versions of their models on Discover. GISS ModelE will perform simulations going back a full millennium and forward to 2100. GMAO will focus on the years 1960 to 2035 and perform decadal prediction simulations using GEOS-5 and atmospheric chemistry-climate simulations using the GEOS Chemistry Climate Model. Employing ESG and its common data format, NCCS expects to distribute more than 50 terabytes of data from IPCC simulations to the climate research community.

Within that community, Webster sees Goddard and NCCS as particularly equipped to make contributions. "We have a tremendous amount of observational data, which is captured by our satellites," he said. "We have probably the largest collection of Earth scientists anywhere in the world, and we have this new state-of-the-art computing center. The combination of the data, the scientists, and the computing puts us in a unique position to enable advances in weather and climate research."

For more information, visit the NASA Center for Climate Simulation: <http://www.nccs.nasa.gov> or the Global Modeling and Assimilation Office: <http://gmao.gsfc.nasa.gov>. ■

The Goddard Crater

By NASA

Goddard Crater is located along the Moon's eastern limb (14.8 N, 89.0 E). Data from the Lunar Orbiter Laser Altimeter (LOLA) show the floor of the 90 km diameter crater to be relatively flat and smooth.

LOLA, flying onboard the *Lunar Reconnaissance Orbiter*, is measuring the slope of potential landing sites and lunar surface roughness. LOLA is generating a high-resolution, 3-D map of the Moon. LOLA is also measuring and analyzing the lunar topography to identify permanently illuminated and permanently shadowed areas. Certain mountain peaks at the lunar poles might be permanently illuminated. These regions may be good places for a solar power station.

Like our Center, the crater is named after pioneering rocket scientist Robert H. Goddard (1882-1945). Considered to be the father of modern rocketry, Goddard built the world's first liquid-fueled rocket. The *Lunar Reconnaissance Orbiter* on which LOLA flies was designed and built at Goddard.

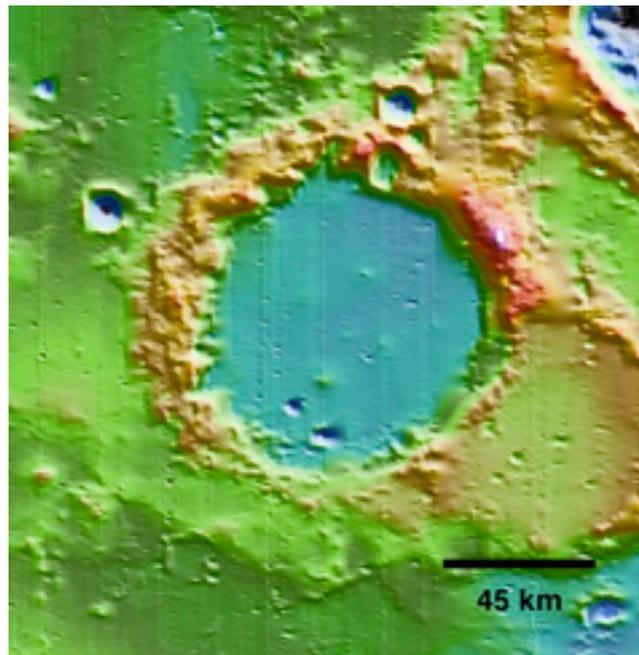


Photo credit: NASA

Caption: The Goddard Crater imaged by the Lunar Orbiter Laser Altimeter.

To learn more about Robert H. Goddard, visit: http://www.nasa.gov/centers/goddard/about/history/dr_goddard.html. For more information about the Lunar Reconnaissance Orbiter, visit: <http://www.nasa.gov/LRO> ■

Celebrate Goddard Day Photo Gallery

Photos by Debora McCallum and Bill Hrybyk



NASA Completes Critical Design Review of Landsat Data Continuity Mission

By Sarah DeWitt and Ronald Beck

The Landsat Data Continuity Mission (LDCM) reached a major milestone last week when it successfully completed its Mission Critical Design Review (CDR).

From May 25-27, an independent review board chaired by Steve Jurczyk, Deputy Director at NASA's Langley Research Center, Hampton, Va., met at NASA's Goddard Space Flight Center in Greenbelt, Md. to conduct the review. The CDR certifies that the maturity of the LDCM design is appropriate to support proceeding with full-scale fabrication, assembly, integration, and test of the mission elements leading to observatory integration and test.

"This review highlighted the collective efforts of a dedicated NASA, U.S. Geological Survey, and industry team working diligently towards the development, launch, and operation of the LDCM," said Bill Ochs, LDCM project manager.

LDCM NASA and industry personnel addressed a variety of topics, including the LDCM spacecraft and its instrument payload, system-level test plans for flight hardware and software, systems engineering, mission assurance, the ground system, and science.

NASA plans to launch LDCM in December 2012 as the follow-on to Landsat-5, launched in 1984, and Landsat-7, launched in 1999. Both satellites continue to supply images and data, but they are operating beyond their design lives. As with preceding Landsat missions, the U.S. Geological Survey will operate LDCM and maintain its data archive once it reaches orbit and begins operational observations. LDCM will extend Landsat's unparalleled record of Earth's changing landscapes.

"We provide data critical to observing dramatic ongoing changes to the global land surface and to understanding the impact of land use change on climate, food and fiber production, water resources, national security, and many other important societal issues," said David Hair, project manager, U.S. Geological Survey, Sioux Falls, S.D.

LDCM will carry evolutionary technology that will improve performance and reliability of the mission," said Jim Irons, LDCM NASA project scientist at Goddard.

The LDCM spacecraft (provided by Orbital Sciences Corp., Gilbert, Ariz) will carry two instruments, the Operational Land Imager (OLI) and the Thermal Infrared Sensor (TIRS). OLI, now being developed by Ball Aerospace & Technologies Corp. will capture images for nine spectral bands in the shortwave portion of the spectrum (visible, near infrared, and shortwave infrared). The Goddard-built TIRS will coincidentally collect data for two longwave (thermal) spectral bands. The LDCM ground system will merge the data from both sensors into a single multispectral image product. These data products will be available for free to the general public from the USGS enabling a broad scope of scientific research and land management applications.

For more than 30 years, Landsat satellites have collected data of Earth's continental surfaces to support global change research and applications. This data constitutes the longest continuous record of the Earth's surface as seen from space.

NASA's Goddard Space Flight Center procures and manages the acquisition of the LDCM in partnership with the Department of the Interior's U.S. Geological Survey. NASA will turn over management of the LDCM satellite to the USGS after launch and on-orbit checkout.

For more information about LDCM, visit: <http://ldcm.nasa.gov>. ■



Photo credit: Orbital Sciences Corporation

Caption: The Landsat Data Continuity Mission spacecraft mock-up at Orbital Sciences Corporation's engineering facility. The mock-up is a full scale model of the satellite, enabling engineers to check that all components seat and connect correctly.

Hubble Fan Gets New Crew Photo and Patch After Fire Destroys His Home

By Christina Coleman

Brady Morris is no stranger to practical jokes. He pulls them frequently on his friends. So when his roommate ran into his bedroom on Dec. 29, 2009, only four days after Christmas, and screamed “Fire!” he wasn’t too worried. That is until he saw the trees outside of his apartment glowing fiery orange. “I grabbed my car keys and my dog and got out of the building,” Morris said. “By the time I moved my car, the building was gone.”

Thankful for his life, Morris, 34, didn’t realize the scope of damage until firefighters started shoveling out charred belongings. That was when he realized he had lost one of his most prized possessions, an autographed photograph of the *Hubble Space Telescope* Servicing Mission 1 crew, and a SM1 patch, reduced to a melted piece of burned debris.

Just hours before, the mission patch and autographed photo were proudly displayed in a shadow box on Morris’ wall. Now he found himself explaining to a local newspaper reporter that these were the only items he could not replace, the only material things he cared about.

In 1994, Morris traveled to Washington, D.C. after winning a high school essay contest. There he participated in a program titled “Presidential Classroom,” that allowed students to sit in on Congressional hearings. One day Morris happened to stumble upon a hearing involving the crew that had just returned from the first maintenance and repair mission to the *Hubble Space Telescope*.

“I was completely engrossed in everything,” Morris said. As luck would have it, a curator from the National Air and Space Museum handed him a photograph of the crew, and suggested Morris go up and get it signed by the astronauts.

“I’m like, ‘No way!’ I never met an astronaut face to face and now I’m meeting seven who went on this historical mission,” Morris said.

Excited and in awe, Morris promptly went and purchased a *Hubble* SM1 mission patch and shadow box. They had been his prized possessions ever since, until he lost them in the December fire.

But when NASA called him not long after to offer to replace the photograph, he was sure it was joke...again. “I thought, ‘Way to kick me when I’m down,’ you know?”

Morris soon discovered it was no joke. Mindy Deyarmin, a Program Support Manager at Goddard, had read the article published by *The Tennessean* newspaper and felt compelled to help replace his prized *Hubble* possessions.

Morris soon received an e-mail stating that retired NASA astronaut Tom Akers, one of seven crew members that first serviced *Hubble*, had another autographed crew photo and mission patch for him. Akers cheerfully agreed to drive from his house in Missouri to Nashville to personally present Brady with these items.

“Everything just fell into place,” Morris said. “It really was amazing; it renewed my faith in humanity. There are a lot of good people in this world. I am so humbled.”



Caption: Retired astronaut Tom Akers, right, presents Brady Morris with a signed photo and poster of him and the rest of the Shuttle crew that repaired the Hubble Space Telescope.

“It just seemed like the right thing to do. Bottom line,” said Akers. “It wasn’t even a big deal and anytime we’ve got NASA supporters we ought to give back to them,” he added.

On May 22, Akers met Morris at O’Charleys, Inc. headquarters in Nashville, where Morris works as an IT specialist. Akers presented him with the signed SM1 crew photo, a mission patch, and a compilation photo poster of the crew at work on *Hubble*.

“Nothing could have brought me down that day,” Morris said. “I felt like I won the lottery, I can’t find the words. It’s indescribable.”

O’Charleys’ managers are having the items framed for Morris. He plans to hang them on the wall in his new apartment, just as bright-eyed and excited as he was 16 years prior when he put the originals on display. ■

Solar Dynamics Observatory Mission Science and Education Featured at American Astronomical Society Meeting

By Laura Layton

Hot on the heels of the official commissioning of the *Solar Dynamics Observatory* (SDO), on May 17 at Goddard, the spacecraft has begun its science mission and is sending terabytes of data and stunning images to Earth each day.

SDO's images are revealing surprising new insights about how changes on the Sun affect us here on Earth, so it should come as no surprise that public and media interest in the SDO mission has been running at a fever pitch.

Most recently, the SDO mission was featured at the 216th meeting of the American Astronomical Society (AAS) and the 2010 Solar Physics Division (SPD) Meeting, held jointly from May 23-27 in Miami, Fla. A number of SDO-related events took place that highlighted the mission's first science results. Several education and outreach events also took place in conjunction with the meeting.

A press conference held on May 22 focused on new science results from SDO. The spacecraft captures a terabyte of data and images of the Sun each day and returns them to Earth.

During the press conference, scientists presented recent results from SDO's Atmospheric Imaging Assembly (AIA) instrument, which takes full-disk images in eight different temperature bands that span 10,000 to 36 million degrees Fahrenheit.

Shortly after the AIA instrument opened its doors on March 30, scientists observed a large eruptive prominence on the Sun's edge, followed by a filament eruption a third of the way across the star's disk from the eruption. The observations reveal that even small solar events have large-scale effects that can impact our technological infrastructure on Earth.

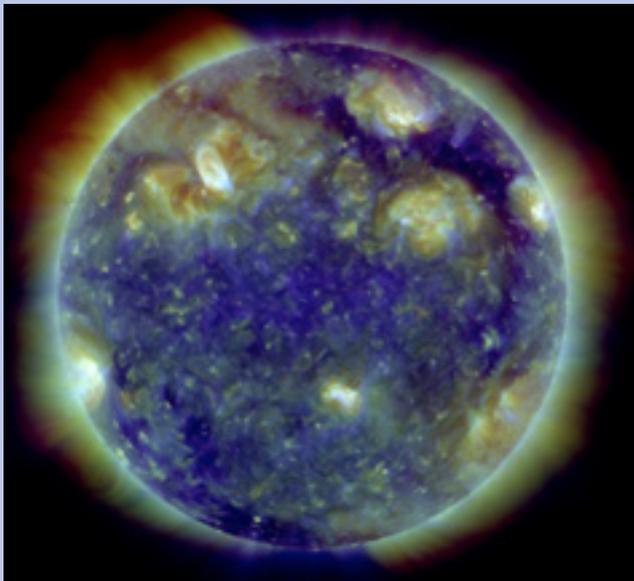


Photo credit: NASA/Goddard

Caption: Composite image of the Sun taken by SDO/AIA on May 4, 2010.

On May 24, SDO Project Scientist Dean Pesnell from Goddard gave a public lecture entitled "The Solar Dynamics Observatory: Your Eye On the Sun." Pesnell described space weather and how it affects our daily lives on a local scale. He also gave an overview of the instruments aboard SDO and how they will measure the heartbeat of space weather.

Oral presentations on SDO's first results took place on May 25. Pesnell and SDO Deputy Project Scientist Barbara Thompson co-chaired the session. SDO's instrument teams gave presentations on the first data from the Helioseismic and Magnetic Imager (HMI), the Extreme Ultraviolet Variability Experiment (EVE), and AIA. SDO team member Alexander Kosovichev, of Stanford University, gave an overview of the 34 first-result SDO posters on display.

Goddard's SDO Education and Public Outreach (EPO) staff, in conjunction with the joint AAS/SPD meeting, organized an AstroZone event held on May 22 at the Miami Dade Main Public Library. AstroZone had five exhibitors and saw more than 300 visitors from the local Miami area. The next AstroZone will be in January 2011 at the AAS Meeting in Seattle, WA.

SDO EPO staff also organized a K-12 educator reception. Local teachers from the Miami area mingled with scientists, discussing science and obtaining resources to take back to their classrooms.

During the AAS/SPD meeting, SDO EPO staff supported the Solar Physics Division booth. The booth highlighted the mission with one monitor featuring recognition software, one playing the science videos, animations, and "Little SDO" videos, and a third playing near-real-time data at high resolution.

The booth was the most popular booth in the exhibit hall. Crowds were so large that passage down the aisle was often difficult. SDO scientists, astronomers, and students crowded the booth, eager to see the latest images streaming in from the spacecraft.

The variety of science results presentations, public talks, poster sessions, and education events gave SDO a successful debut and bodes well for the primary science mission as an integral part of NASA's Heliophysics System Observatory.

For more information about SDO, visit: <http://www.nasa.gov/sdo>. ■

OutsideGoddard: MAD About Theater

By Elizabeth M. Jarrell

Dr. Jaylee Mead and her late husband, Dr. Gilbert Mead, discovered their love for theater through participation in Goddard's Music and Drama (MAD) productions. Jaylee, who joined Goddard in 1959, describes MAD as, "Our employee theater group which produces Broadway-type musicals in a dinner theater format." From the start, Jaylee says that she was "just turned on by the theater. It's something that brings great joy." She continues, "MAD had very good networking, and you knew who you could depend on after being in a production with them."



Caption: Jaylee Meade.

Gil was frequently the music director in charge of the orchestra and chorus. Jaylee's first role was "Babe" in *The Pajama Game*. She later appeared in such productions as *Mame*, *South Pacific*, *Fiddler on the Roof*, and *How to Succeed in Business without Really Trying*. In her final performance, she appeared in *Pippin* as the title character's grandmother. She remembers that she sang "a wonderful song about 'start living today, start living your life now—that's the spirit!'—and I have the spirit!" At 81, Jaylee does indeed have the spirit, and a most generous one at that.

Jaylee and Gil met in 1966 while working across the hall from each other at Goddard. He was a physicist and she, an astronomer, and not, as she is quick to point out, an astrologer. Says Jaylee, "When you see how somebody works, you get to know their style." They married in 1968.

During the 1980s, the Meads took on a new role, that of Washington, D.C. regional theater supporters. They became two of the most generous individual donors to theater in our area. Explains Jaylee, "I became interested in finding out more about the theater downtown where I lived. I wanted to find out more about Studio Theatre." She took a special interest in the Studio

Theatre because it was located in an area that was demolished by the 1968 riots. "Now that same neighborhood is thriving since it attracted the presence of Whole Foods, CVS, great restaurants, and new apartment buildings." She enjoys Studio's contemporary work.

Jaylee joined the Board of the Studio Theatre and was Chairman from 1994 to 2000. "I was involved in getting new board members and fundraising, which I enjoyed. I learned a lot," says Jaylee. She remains involved with the Studio Theatre and is still on their Board. She recently served on their committee to name a new Artistic Director, who will be, appropriately enough, David Muse. Jaylee explains that when looking for a new Artistic Director, "I look for somebody to inspire others to excellence, someone who can also fundraise and direct shows. Someone who is charismatic."

Gilbert's interest in the Arena Stage led him to join their board in 1992. Both he and Jaylee were named Life Trustees in 2006. Through the Meads' extraordinary generosity, the new theater complex will open in October 2010 and will be named Arena Stage at the Mead Center for American Theater.

The Mead Center will consist of three theaters united under a cantilevered roof on the same Arena Stage site near the Southwest D.C. waterfront. The Mead Center will offer educational opportunities including Camp Arena for young people. The gala celebration for the grand opening of the Mead Center will be held on October 25, 2010. Says Jaylee, with a gleam in her eyes, "It's going to be a special night."

Jaylee remains passionate about supporting theater in the Washington, D.C. area and developing our aspiring performers. She says, "I like highlighting people from D.C. One of my hopes for Arena is to highlight the local talent." Arena Stage's recent production of Duke Ellington's *Sophisticated Ladies* is a good example. Jaylee points out that not only was Duke Ellington a Washington, D.C. native, but this particular performance also led to the discovery of two local boys living in the nearby housing projects whom Maurice Hines himself declared to be phenomenal tap dancers. Indeed, these young boys have appeared in numerous television news stories. Another local talent whom Jaylee greatly admires is Holly Twyford. "She's just very versatile and a wonderful actress. She's a dramatic actress."

Explains Jaylee, "When I first got involved in theater here, many actors had to go to New York for work. Our hope was to keep them here." Jaylee is pleased that some recent Broadway productions were "nurtured and improved" at Arena, including last season's *Next to Normal*, which is still running in New York City, and *Looped*, which is about the life of Tallulah Bankhead. Notes Jaylee, "It's so hard to succeed on Broadway because it is so expensive in New York." Jaylee continues, "I go to New York a few times a year. On occasion, I go to the London theater. It's a long trip when we have such good theater here and in New York. I don't really enjoy travel as much now."

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OutsideGoddard: MAD About Theater

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Jaylee has a few favorite playwrights. "I like Tennessee Williams. I think he has written some imaginative things. I also like Edward Albee." As for songwriters, Jaylee says, "I like Rodgers and Hammerstein. They are so singable."

Her favorite old movies include the musical classics "Singing in the Rain," "Oklahoma," and "The King and I." Jaylee says that "It's wonderful how we have these old movies on DVD now and can enjoy them whenever we want. I don't go to as many movies because I go to so much theater." Although Jaylee is enormously fond of musicals and plays, she is not as interested in opera or the ballet. "I've never become a fan. But you can't go to everything." She goes to the theater at least once a week. Jaylee notes, "I go to a lot of opening nights."

She is also very interested in newspapers. "I don't read as many books so much as I read newspapers. I do like politics. Washington is a wonderful place for politics," explains Jaylee.

As for her favorite production ever, there is a tie. "I really like the way Signature Theater did *Showboat*. I also liked *Cabaret* because it is such an interesting story. Just a few words stand for a whole lot." Jaylee's tastes run from both the traditional to the avant-garde. Continues Jaylee, "I liked *Chicago*. The music and rhythm are very moving. The choreography was excellent." As for her favorite actors, Jaylee explains that "I like people who can both dance and sing like Fred Astaire and Gene Kelly, and even Bette Midler." She mentions that "Angela Lansbury is so charming. She's 85 and in really good shape. She's on Broadway now. Last year she won a Tony Award for *Bliithe Spirit*." She also enjoys Tyne Daly who was just in *Master Class* at the Kennedy Center for the Performing Arts.

The Meads also supported the Kennedy Center's efforts to establish the Millennium Stage program. Explains Jaylee, "Every night at 6:00 p.m., there is a free performance. This way people in town can see what they're offering, and it is usually musical."

Says Jaylee, "I'd like to be remembered as someone who liked to give money to help things." That, she and her late husband have done, and then some. ■

Center Director Announces "i am goddard" Campaign

Colleagues:

Goddard Space Flight Center is an amazing place.

Every day, thousands of people come through our gates with a common and profound sense of commitment to the mission of Goddard Space Flight Center. We discover the mysteries of the cosmos, explore the stars, the planets, and everything in between. We strive to understand how our own planet works, and to preserve and protect it for generations that will follow.

I believe the diversity of our community is a microcosm of the world we live in. As our community and Nation become increasingly diverse, our ability to thrive in this dynamic time means creating a culture that embraces diversity, fosters inclusion, and seeks innovation from all sources.

Goddard is a leader within NASA and throughout the Federal Government in recognizing the changes taking place in the country. We established one of the first Diversity positions in the Agency, and we've made diversity and inclusion an essential part of our day-to-day business.

Beginning today, we are kicking off an exciting campaign called, "i am goddard." It will remind us of the basic principles that make a high performing, diverse and inclusive organization successful in today's world. "i am goddard" embodies the enormous pride we all share as part of this incredible community of people.



I encourage you to visit the campaign's Web site at:

<https://internal.gsfc.nasa.gov/web/community/iamgoddard>. Within it, you will find more information about the initiatives and how you can get involved. Also, look for the "i am goddard" team at Celebrate Goddard on June 24 and learn about the campaign and activities to promote and sustain this initiative.

As we look to the future, I know that the incredible achievements the world has come to expect from Goddard will continue. I am Goddard and I hope you feel that you are too.

Rob Strain
Center Director



Doolittle Raider Visits Goddard

By Grace Montalvo and Melissa Quijada

After a bombing run over Japan in 1942, Col. Richard Cole's plane ran out of fuel. He and his crew were forced to bail out over China, then waited days to be rescued. Now with NASA advanced search and rescue technology and a rescue beacon on his plane Cole would've seen help much sooner due to the satellite-based work of engineers and pilots like his son, Richard Cole, Jr.

"This new technology could have detected Cole's plane in under a minute," said David Affens, the Search and Rescue Mission Manager Goddard.

Cole is one of eight surviving members of the Doolittle Raid. The Doolittle Raid was conducted to boost American morale after the devastating attacks on Pearl Harbor. Lt. Col. James Doolittle, Cole's commanding officer, led 16 Army B-25 medium bombers, each with a crew of five, across Japan's five major cities on Apr. 18, 1942. The Doolittle Raiders volunteered for a "dangerous secret mission" without knowing their exact destination and the historical nature of their flights. This air raid was the first American secret mission to bomb Japan. Doolittle's bomber plane, with Cole as the co-pilot, flew over the northern part of Tokyo, Japan's capital. This mission was the subject of the book "Thirty Seconds over Tokyo."

Sixty-eight years later, Cole toured the Goddard campus on June 8 with his son, daughter, and grandson. Both Cole and his grandson, Elliot Chal, were both wearing ties flowered with airplanes as they walked through Goddard. Cole said he has also visited the Johnson and Kennedy NASA Space Centers.

Cole and his family came to Goddard primarily to observe his son's work on the campus and learn more about NASA.

The tour's first stop was at the Search and Rescue lab in Building 25, where Cole's son works. Richard Cole, Jr. is a former Air Force pilot of 19 years and now works with NASA helping the U.S. Department of Defense develop technologies to upgrade its rescue efforts to the same caliber as those of the civil community.



Caption: Col. Richard Cole (r), his daughter (center), and his grandson (back) look at satellite images of Cole's home in Texas.

While on tour at the lab, Affens exhibited three-dimensional satellite images on a large flat screen used to locate those in need of rescue. Cole Sr. called the technology "fascinating." Affens even located Cole's home near San Antonio, Texas at his daughter's request using the satellite imagery

Affens said he wished the technology could find the missing Doolittle Raid B-25 bomber plane that landed in Russia. Cole, Sr. had his own conjecture of the plane's fate. "I think the Russians used it and put another crew in it," he said jokingly.



Caption: Col. Richard Cole (r) presents a watercolor painting of a B-29 to Goddard Center Director Rob Strain.

The family then toured the climate and satellite hub in Building 32 at the Earth Science Control Center. Next on the Goddard tour was the High Bay clean room and other surrounding points of interest. Throughout the tour, Cole, Sr. asked many questions while looking over models and equipment.

"NASA is a good indication how far technical knowledge has traveled since 1942 until now. There's a lot of things I can talk about that you wouldn't believe took place," said Cole, mentioning that most of the technology he saw was over his head.

As a highly decorated Air Force pilot, Cole Sr. has received a Distinguished Flying Cross with two Oak Leaf Clusters, an Air Medal with one Oak Leaf Cluster, a Bronze Star Medal, an Air Force Commendation Medal, and Chinese Army, Navy, Air Corps Medals.

With at least two generations of airplane pilots behind him, Cole's grandson, Elliot, plans to continue the tradition next year, entering a five-year program at West Point to prepare his ambitions to enter the U.S. military.

Cole gave a watercolor painting of a B-25 bomber to Goddard Center Director Rob Strain on behalf of the Doolittle Foundation. The family received Goddard pens from the Director in return.

Richard Cole's visit to Goddard showed him how far technology had come since World War II, and how search and rescue is a lot easier with satellites and a computer network. ■